

***IN THE UNITED STATES PATENT AND TRADEMARK OFFICE***

Applicant: Erdemir et al.  
Title: IMPROVED METALWORKING  
AND MACHINING FLUIDS  
Appl. No.: 10/532,556  
International Filing Date: 10/24/2003  
371(c) Date: 10/28/2005  
Examiner: James C. GOLOBOY  
Art Unit: 1797  
Confirmation Number: 5762

**AMENDMENT AND REPLY UNDER 37 CFR 1.111**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This communication is responsive to the Non-Final Office Action dated 08/05/2008, concerning the above-referenced patent application. Applicant believes this response is timely filed.

The Commissioner is hereby authorized to charge any fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect

credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

**Amendments to the Claims** are reflected in the listing of claims which begins on page 3 of this document.

**Remarks/Arguments** begin on page 6 of this document.

Please amend the application as follows:

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-23. (Canceled)

24. (Currently Amended) A method of providing lubricity in a forming or machining fluid, comprising the steps of:

- providing a forming or machining fluid;
- providing a boron compound; and
- ~~mixing~~dissolving the boron compound in ~~the~~[[a]] forming or machining fluid~~carrier~~ at a concentration of from about 2% to about 24% by weight in~~the forming or machining fluid;~~

wherein

- the boron compound is boric acid;
- the boron compound is in the form of a nanometer-sized particulate and;
- the forming or machining fluid is selected from the group consisting of n-alcohols, polyalkyleneglycols, polyvinyl alcohol, glycerol, and combinations of any two or more thereof.

25-29. (Canceled) .

30. (Currently Amended) The method of claim 24, further comprising the step of dissolving the boron compound in a solvent before ~~mixing with~~being added to the forming or machining fluid ~~carrier~~.

31. (Currently Amended) The method of claim 30, wherein the solvent is selected from the group consisting of methanol, ethanol, isobutyl alcohol, pyridine, isoamyl alcohol, n-

propanol alcohol, alcohol, 2-methylbutanol, glycerol, ~~glyeol~~, lactate esters and combinations thereof.

32. (Currently Amended) The method of claim 24[[25]] wherein ~~hot water is used as the carrier for the method~~ further comprises spraying, roll-coating or dipping a metal substrate in the forming or machining fluid ~~a solution of boric acid for the purpose of metal forming.~~
33. (Currently Amended) The method of claim 32 wherein the forming or machining fluid ~~hot water~~ and the[[a]] boron compound are introduced simultaneously within an applicator for the purpose of metering the ~~varying amount~~[[s]] or concentration[[s]] of the forming or machining fluid ~~solution~~ onto a substrate via a spray application.
34. (Currently Amended) The method of claim 24[[25]] wherein the forming or machining fluid is methanol ~~is used as the carrier for~~ and the method further comprises spraying, roll-coating or dipping a metal substrate in the forming or machining fluid ~~a solution of boric acid for the purpose of metal forming.~~
35. (Currently Amended) The method of claim 24[[25]] wherein ~~glyeol~~, glycerol[[.]] or a polyalkylene glycol is the forming or machining fluid ~~used as a carrier for the purpose of providing cooling and lubrication in a machining operation of a metal or alloy.~~
36. (Currently Amended) The method of claim 32, ~~wherein further comprising drying the forming or machining fluid to a dry film to is formed, and wherein the resulting dry film provides improved cooling and lubrication in metal parts stamping operations.~~
37. (Currently Amended) The method of claim 32 ~~wherein further comprising drying the forming or machining fluid to a dry film is formed, and wherein the resulting dry film is capable of being easily removed with a cold water rinse after a~~ the metal forming operation.

38-41. (Canceled.)

42. (Currently Amended) The method of claim 35 wherein the machining fluid is ~~by nature,~~ stable and odor-free, ~~generating parts that require little or no post operation treatment or cleaning.~~

43. (Canceled.)

44. (Currently Amended) The method of claim 24, wherein the forming or machining fluid is a includes drilling mud[[s]].

45. (Currently Amended) A method of applying a boron compound in a powder form or suspended in a liquid form directly onto a substrate using electro-static methods to lubricate ~~achieve a higher degree of lubricity on~~ the surface of the substrate wherein the boron compound is in the form of a nanometer-sized particulate.

46. (Canceled.)

## **REMARKS**

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 24, 30-37, 42, and 44-45 are amended. Claims 25-29, 38-41, 43 and 46 are canceled. After amending the claims as set forth above, claims 24, 30-37, and 42-45 will be pending in this application. Applicants submit that the amendments are fully supported by the specification as originally filed including, but not limited to the claims as originally filed and the examples provided. No new matter has been added by way of amendment. Applicants expressly reserve the right to pursue any of the amended claims, in a timely filed continuation or divisional application.

### **I. Office Action Paragraphs 3-5**

Claim 24 stands rejected under 35 USC 112, second paragraph as being indefinite. Applicants have amended claim 24 to clarify that it is weight percent that is the basis for the concentration, thus rendering the grounds for rejection moot.

Claims 37, 41, and 42 stand rejected under 35 USC 112, second paragraph as being indefinite for reciting the terms “easily,” “better,” and “typically.” Claims 37 and 42 have been amended to address the rejections, and claim 41 has been canceled. In view of the amendments and cancellations, Applicants submit that the grounds for rejection are now moot.

Claims 25, 32, and 33 stand rejected under 35 USC 112, second paragraph as being indefinite for reciting the term “hot.” Applicants point out that claim 25 has been canceled and that “hot” has been deleted from claims 32 and 33, thereby rendering moot the grounds for rejection.

Applicants submit that in view of the amendments, the claims are definite. As such, Applicants respectfully request that the Examiner removed the noted rejections and allow the application to move forward to issuance.

## **II. Office Action Paragraphs 7-11.**

### *Paragraphs 7-10*

In paragraphs 7-10 of the instant Office Action, 35 U.S.C. § 102(b) forms the basis for the rejections. In paragraph 7, Claims 24-26, 28, 29, 25, 40-42, 44, and 46 stand rejected as anticipated by US 4,448,701 issued to Duerksen. In paragraph 8, Claims 24-25 stand rejected as anticipated by US 4,039,337 issued to Brown. In paragraph 9, Claims 24-26, 28, and 46 stand rejected as anticipated by US 5,512,191 issued to Krueger. In paragraph 10, Claims 24-26, and 46 stand rejected as anticipated by US 5,547,595 issued to Hacias. Applicants respectfully traverse these rejections.

Applicants note that Claim 24 has been amended, in part, with the subject matter of claim 27, which has been shown by the Examiner to be free of the cited art under 35 U.S.C. § 102(b) in view of Duerksen, Brown, Krueger, and Hacias. As such, Applicants respectfully request withdrawal of these rejections.

### *Paragraph 11*

In paragraph 11, Claim 45 stands rejected under 35 U.S.C. § 102(b) as anticipated by US 5,468,401 issued to Lum *et al.* Applicants respectfully traverse this rejection.

Claim 45 presently recites:

A method of applying a boron compound in a powder form or a liquid form directly onto a substrate using electro-static methods to lubricate the surface of the substrate wherein the boron compound is in the form of a nanometer-sized particulate.

Because Lum fails to disclose the size of the boron compound or that the boron compound is boric acid, Lum cannot be found to anticipate the presently claimed invention. Lum generically provides for boron nitride powders at col. 8, lines 61-63. However, there is no discussion or description of the scale on which the boron nitride powders exist. Lum also fails to

teach or disclose the use of boric acid. Here, Applicants have specifically found and claimed the nanometer size. Because Lum fails to provide for an accounting of the size of the boron nitride powder, Lum cannot anticipate the presently presented claims, and Applicants respectfully request that the Examiner withdraw the standing rejection.

### **III. Office Action Paragraphs 14-19.**

#### *Paragraph 14*

In paragraph 14, Claim 27 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Brown. The basis for the rejection was that Brown disclosed a boron nitride compound in a size range of 500 to 2000 nanometers. Applicants respectfully traverse this rejection.

Claim 24 has been amended to include the subject matter of former claims 26, in part, and 27. Claim 24 is currently directed to methods using a boron compound that is boric acid. Because Brown fails to teach or discuss the use of boric acid itself, much less the size of a boric acid nanoparticle, Applicants submit that there is no reason given to one of skill in the art to practice the presently claimed invention. There is nothing in Brown to suggest that boric acid may be used in a lubricating composition. As such Applicants respectfully request withdrawal of the rejection of Claim 27 based upon Brown.

#### *Paragraph 15*

In paragraph 15, Claims 30 and 31 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Duerksen. The Examiner alleges that the claims are obvious because Duerksen dissolves a boron compound in water and glycol, but does not disclose the order. Applicants respectfully traverse this rejection.

Claims 30 and 31 depend from claim 24. Claim 24 is directed to a method of providing lubricity in a forming or machining fluid. The claimed method uses addition of nanoparticulate boric acid to a forming or machining fluid. Applicants respectfully submit that Duerksen does



not disclose a method of providing lubricity and/or such a method that incorporates boric acid as a nanoparticle.

Duerksen is directed to cutting fluids for fissionable materials. Title. The cutting fluids of Duerksen utilize a boron compound as a neutron attenuator. Col. 2, lines 12-14. The lubricity of the cutting fluids is provided by a glycol that is either ethylene glycol or propylene glycol, as taught by Duerksen, and in fact, Duerksen states “[t]he glycol provides the necessary lubrication...” Col. 2, lines 3-4 and 26. Duerksen adds boric acid or borax to the cutting fluid for one purpose: attenuating neutrons from the fissionable materials. Col. 2, lines 5-14. However, Duerksen fails on three fronts with respect to the presently claimed invention.

First, Duerksen fails to teach or suggest the claimed forming or machining fluids. The presently claimed invention describes the forming or machining fluids as being “selected from the group consisting of n-alcohols, polyalkyleneglycols, mineral oils, synthetic base oils, greases, glycerol, vegetable based oils and combinations of any two or more thereof.” Duerksen only teaches the use of ethylene or propylene glycol. Applicants submit that for at least this reason the rejection based upon Duerksen alone must fail.

Second, Duerksen fails to teach or suggest boric acid in a nanoparticulate form, and without description of the same, Duerksen cannot be found to teach each and every element of the claims. Applicants submit that for at least this reason the rejection based upon Duerksen alone must fail.

Third, Duerksen fails to recognize that the addition of nanoparticulate boric acid to the forming or machining fluid will provide lubricity. The Examiner is reminded that the claims are directed to a *method* of providing lubricity. In, Duerksen the boric acid, or the borax, is added for the purpose of neutron attenuation. The skilled artisan is not provided with guidance or reason to perform a method in which the lubricity of a machining or forming fluid is modified with boric acid. Applicants submit that Duerksen cannot form the basis for a *prima facie* case of obviousness. As the Federal Circuit stated in *In re Rijckaert* “That which may be inherent is not

necessarily known. Obviousness cannot be predicated on what is unknown.” 9 F. 3d 1531, 28 USPQ2D 1955, 1957 (Fed. Cir. 1993). For at least the reason that Duerksen fails to provide any motivation or reasons to one of skill in the art to provide lubricity to a forming or machining fluid via the addition of a boron compound, Applicants submit that the rejection based upon Duerksen must fail.

As such, Applicants respectfully request withdrawal of the rejection of Claims 20 and 31 based upon Duerksen.

*Paragraph 16*

In paragraph 16, Claim 43 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Duerksen as applied in paragraph 7, in view of Erdemir. Applicants point out that claim 43 has been canceled, and therefore the grounds for this rejection are rendered moot. However, because the particle size elements have been brought to claim 24, and the Examiner states that while Duerksen discloses a method meeting the limitations of claim 43 but does not disclose the particle size of the boric acid, Applicants address the combination of Duerksen with Erdemir.

As stated above, Duerksen fails at least to disclose the presently claimed forming or machining fluids, the nanoparticulate size of the boric acid, and a reason for the skilled artisan to modify the teachings of Duerksen to arrive at the presently claimed methods. Therefore, Erdemir must fill in where Duerksen fails in this regard. Applicants submit that it does not.

Erdemir is directed to the preparation of lubricants to prevent or reduce wear on the moving parts in machinery. *See* Col. 1, lines 25-31. As shown in the examples, Erdemir mixes an oil or grease with boric acid for form a lubricant for testing in a wear test machine. Col. 5, lines 45-59. However, Erdemir does not disclose or suggest the use of the lubricants as machining or forming fluids, generally, and he does not disclose or suggest the machining or forming fluids as specifically identified in the claims: *i.e.* n-alcohols, polyalkyleneglycols, polyvinyl alcohol, glycerol, and combinations of any two or more thereof.

Because Duerksen and Erdemir, alone or in combination fail to at least disclose or suggest the presently claimed machining or forming fluids, Applicants submit that a *prima facie* case of obviousness has not been established.

*Paragraph 17*

In paragraph 17, Claims 32 and 36-39 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hacias as applied in paragraph 10 in view of U.S. 4,262,057, issued to Godek. Applicants respectfully traverse this rejection.

As shown above with respect to Hacias, claim 24, from which claims 32 and 36-39 depend, was shown to be free of the prior art due to incorporation of claim 27. Therefore, Godek must fill in where Hacias fails to support a case of *prima facie* obviousness. It does not.

Godek is directed to metal drawing compositions that include using a soap-borax composition having a pH in the range of from about 7.6 to 9. Col. 1, lines 44-48. To adjust the pH of the soap-borax composition, boric acid may be used. *See* Example 3.

However, Godek, like Hacias, fails to teach or suggest the use of nanoparticulate boric acid, as is recited in claim 24. As such, Applicants submit that each and every element of the presently claimed invention has not been shown in Godek and/or Hacias and therefore the rejection based upon these two references must fail.

*Paragraph 18*

In paragraph 18, Claims 32-33 and 36-39 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hacias as applied in paragraph 10 in view of U.S. 3,974,674, issued to Orozco. Applicants respectfully traverse this rejection.

Orozco teaches the use of dry films, substantially free of water, for draw forming of metal. Col 1. lines 43-58. The dry films of Orozco are prepared from “a high-titre soap...a suitable plasticizer for the soap, a viscosity stabilizer..., two water soluble polymeric materials

capable of condensing with each other and forming cross links upon drying of the coating, and a water soluble glass-forming pigment such as borax...” Col. 3, lines 20-29. There is no teaching or discussion of boric acid, or a particulate size for boric acid in Orozco.

Because Orozco, like Hacias fails to describe the particulate size of boric acid, as presently recited in the claims, the combination of references fails to teach each and every element of the claims. As such, Applicants submit that a *prima facie* case of obviousness has not been established and request that the Examiner withdraw the noted rejections.

*Paragraph 19*

In paragraph 19, Claims 30, 31 and 34 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hacias as applied in paragraph 10, and Godek as applied in paragraph 17, and further in view of U.S. 4,330,419, issued to Hall. Applicants respectfully traverse this rejection.

As shown by the Examiner, Claim 24, as currently amended, is free of the prior art of Hacias. Also as shown, Godek fails to provide for the deficiencies of Hacias with respect to this claim. As claims 30, 31, and 34 also depend from claim 24, Hall must fulfill the requirement that each and every element of the claims be shown in the prior art. Applicants submit that Hall fails as well in this regard.

Hall is directed to the use of compositions of boric acid, methanol and hydrochloric acid for use in dissolving fluoride deposits in tools or in subterranean formations. Col. 1, lines 5-8 and col. 2, lines 38-39. The compositions are then applied to tubing or subterranean formations having fluoride scale which the compositions then dissolves and removes. Col. 2, line 52 to col. 3, line 2. Such compositions are useful in oil production facilities. Col. 3, lines 3-4.

Hall fails to discuss or provide any discussion of lubricants or lubricity of metal forming or machining fluids. Hall fails to discuss or provide any discussion of boric acid that is nanoparticulate. Hall fails to provide any reasons to one of skill in the art to use boric acid in a carrier to provide lubricity to a metal forming or machining fluid.

Because Hall fails to fill the voids of Hacias or Godek, Applicants submit that a *prima facie* case of obviousness has not been established. Applicants respectfully request that the Examiner withdraw the noted rejection and allow the application to move forward to issuance.

For the reasons provided above, each of the rejections under 35 U.S.C. § 103(a) have been overcome. Applicants respectfully request that the Examiner withdraw the remaining rejections and allow the application to move forward to issuance.

### CONCLUSIONS

Applicants believe that the present application is now in condition for allowance. The Examiner is requested to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date: October 20, 2008

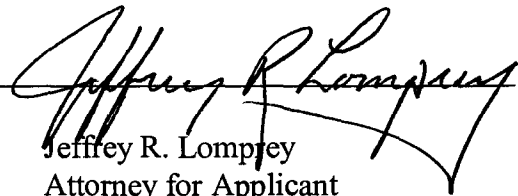
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